WHAT IS CLAIMED IS:

1. A method for cleaning a process chamber, comprising the steps of:

introducing at least one cleaning gas to the process chamber via a section connected to the process chamber; and

applying at least one high power density light beam to the section or to the process chamber, wherein the high power density light beam(s) assists dissociation of the cleaning gas in either the section or the process chamber, thereby achieving cleaning activity of the cleaning gas in the process chamber.

2. The method of claim 1, wherein the section is connected on top of the process chamber.

3. The method of claim 1, wherein the cleaning gas is selected from the group consisting of a fluorine-containing gas, a chlorine-containing gas and other halogen-containing gases.

4. The method of claim 3, wherein the fluorine-containing gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

5. The method of claim 1, wherein the high power density light beam(s) has a wavelength range from about 190 nm to about 10 μm.

6. The method of claim 1, wherein the high power density light beam(s) has an energy density range from about 1 W/mm^2 to about 2 MW/mm^2.

7. The method of claim 1, wherein the high power density light beam(s) comprises an incoherent light beam(s) or a laser light beam(s).

8. The method of claim 7, wherein the laser beam(s) is focused or expanded.

9. The method of claim 7, wherein the laser beam(s) is a pulsed type or a continuous wave type laser beam(s).

10. A method for cleaning a process chamber, comprising the steps of:

introducing at least one halogen-containing cleaning gas to the process chamber via a section connected to the process chamber; and

applying at least one high power density light beam comprising an incoherent light beam or a laser light beam to the section or to the process chamber, wherein the high power density light beam(s) assists dissociation of the halogen-containing cleaning gas in either the section or the process chamber, thereby achieving cleaning activity of the halogen-containing cleaning gas in the process chamber.

11. The method of claim 10, wherein the section is connected on top of the process chamber.

12. The method of claim 10, wherein the halogen-containing gas is a fluorine-containing gas or a chlorine-containing gas.

13. The method of claim 12, wherein the fluorine-containing gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

14. The method of claim 10, wherein the high power density light beam(s) has a wavelength range from about 190 nm to about 10 μm.

15. The method of claim 10, wherein the high power density light beam(s) has an energy density range from about 1 W/mm^2 to about 2 MW/mm^2.

16. The method of claim 10, wherein the laser beam(s) is focused or expanded.

17. The method of claim 10, wherein the laser beam(s) is a pulsed type or a continuous wave type laser beam(s).

18. A method for cleaning a process chamber, comprising the steps of:

introducing at least one fluorine-containing cleaning gas to the process chamber via a section connected to the process chamber; and

applying at least one high power density laser beam having a wavelength range from about 190 nm to about 10 μm and an energy density range from about 1 W/mm^2 to about 2 MW/mm^2 to the section or to the process chamber,

wherein the high power density laser beam(s) assists dissociation of the fluorine-containing cleaning gas in either the section or the process chamber, thereby achieving cleaning activity of the fluorine-containing cleaning gas in the process chamber.

19. The method of claim 18, wherein the section is connected on top of the process chamber.

20. The method of claim 18, wherein the fluorine containing gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

21. The method of claim 18, wherein the laser beam(s) is focused or expanded.

22. The method of claim 18, wherein the laser beam(s) is a pulsed type or a continuous wave type laser beam(s).

23. A method for cleaning a process chamber, comprising the steps of:

introducing at least one precursor gas to the process chamber via a section connected to the chamber;

applying at least one high power density light beam to the section or directly to the process chamber; and

applying a plasma to the process chamber, wherein the plasma activates the precursor gas to generate reactive species, and wherein the high power density light beam(s) assists dissociation of the reactive species, thereby cleaning the process chamber.

24. The method of claim 23, wherein the reactive species are generated from a precursor gas selected from the group consisting of a fluorine-containing gas, a chlorine-containing gas, and other halogen-containing gases.

25. The method of claim 24, wherein the fluorine-containing gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

26. The method of claim 23, wherein the high power density light beam(s) has a wavelength range from about 190 nm to about 10 μm.

27. The method of claim 23, wherein the high power density light beam(s) has an energy density range from about 1 W/mm^2 to about 2 MW/mm^2.

28. The method of claim 23, wherein the high power density light beam(s) comprises an incoherent light beam(s) or a laser light beam(s).

29. The method of claim 28, wherein the laser light beam(s) is focused or expanded.

30. The method of claim 28, wherein the laser light beam(s) is a pulsed type or a continuous wave type.

31. A method for cleaning a process chamber, comprising the steps of:

introducing at least one halogen-containing precursor gas to the process chamber via a section connected to the process chamber;

applying at least one high power density light beam comprising an incoherent light beam or a laser light beam to the section or directly to the process chamber; and

applying a plasma to the process chamber, wherein the plasma activates the precursor gas to generate reactive species, and wherein the high power density light beam(s) assists dissociation of the reactive species, thereby cleaning the process chamber.

32. The method of claim 31, wherein the reactive species is generated from a fluorine-containing gas or a chlorine-containing gas.

33. The method of claim 32, wherein the fluorine-containing gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

34. The method of claim 31, wherein the high power density light beam(s) has a wavelength range from about 190 nm to about 10 μm.

35. The method of claim 31, wherein the high power density light beam(s) has an energy density range from about 1 W/mm^2 to about 2 MW/mm^2.

36. The method of claim 31, wherein the laser light beam(s) is focused or expanded.

37. The method of claim 31, wherein the laser light beam(s) is a pulsed type or a continuous wave type.

38. A method for cleaning a process chamber, comprising the steps of:

introducing at least one fluorine-containing precursor gas to the process chamber via a section connected to the process chamber;

applying at least one high power density laser beam having a wavelength range from about 190 nm to about 10 μm and an energy density range from about 1 W/mm^2 to about 2 MW/mm^2 to the section or directly to the process chamber; and

applying a plasma to the process chamber, wherein the plasma activates the fluorine-containing precursor gas to generate reactive species, and wherein the high power density laser beam(s) assists dissociation of the reactive species, thereby cleaning the process chamber.

39. The method of claim 38, wherein the fluorine-containing precursor gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

40. The method of claim 38, wherein the laser light beam(s) is focused or expanded.

41. The method of claim 30, wherein the laser light beam(s) is a pulsed type or a continuous wave type.

42. A method for cleaning a process chamber, comprising the steps of:

introducing at least one precursor gas to a remote chamber, wherein the remote chamber is connected to the interior of the process chamber;

activating the precursor gas in the remote chamber to generate reactive species;

introducing the reactive species to the process chamber via a section connected to the chamber; and

applying at least one high power density light beam to the section, wherein the high power density light beam(s) assists dissociation of the reactive species, thereby cleaning the process chamber.

43. The method of claim 42, wherein the reactive species is generated from a precursor gas selected from the group consisting of a fluorine-containing gas, a chlorine-containing gas and other halogen-containing gases.

44. The method of claim 43, wherein the fluorine-containing gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

45. The method of claim 42, wherein the high power density light beam(s) has a wavelength range from about 190 nm to about 10 μm.

46. The method of claim 42, wherein the high power density light beam(s) has an energy density range from about 1 W/mm^2 to about 2 MW/mm^2.

47. The method of claim 42, wherein the high power density light beam(s) comprises an incoherent light beam(s) or a laser light beam(s).

48. The method of claim 47, wherein the laser light beam(s) is focused or expanded.

49. The method of claim 47, wherein the laser light beam(s) is a pulsed type or a continuous wave type.

50. A method for cleaning a process chamber, comprising the steps of:

introducing at least one halogen-containing precursor gas to a remote chamber, wherein the remote chamber is connected to the interior of the process chamber;

activating the halogen-containing precursor gas in the remote chamber to generate reactive species;

introducing the reactive species to the process chamber via a section connected to the chamber; and

applying at least one high power density light beam comprising an incoherent light beam or a laser light beam to the section, wherein the high power density light beam(s) assists dissociation of the reactive species, thereby cleaning the process chamber.

51. The method of claim 50, wherein the reactive species is generated from a fluorine-containing gas or a chlorine-containing gas.

52. The method of claim 51, wherein the fluorine-containing gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

53. The method of claim 50, wherein the high power density light beam(s) has a wavelength range from about 190 nm to about 10 µm.

54. The method of claim 50, wherein the high power density light beam(s) has an energy density range from about 1 W/mm^2 to about 2 MW/mm^2.

55. The method of claim 50, wherein the laser light beam(s) is focused or expanded.

56. The method of claim 50, wherein the laser light beam(s) is a pulsed type or a continuous wave type.

57. A method for cleaning a process chamber, comprising the steps of:

introducing at least one fluorine-containing precursor gas to a remote chamber, wherein the remote chamber is connected to the interior of the process chamber;

activating the fluorine-containing precursor gas in the remote chamber to generate reactive species;

introducing the reactive species to the process chamber via a section connected to the chamber; and

applying at least one high power density laser beam having a wavelength range from about 190 nm to about 10 μm and an energy density range from about 1 W/mm^2 to about 2 MW/mm^2 to the section, wherein the high power density laser beam(s) assists dissociation of the reactive species, thereby cleaning the process chamber.

58. The method of claim 57, wherein the fluorine-containing precursor gas is selected from the group consisting of F.sub.2, NF.sub.3, SF.sub.6, C.sub.2F.sub.6, CF.sub.4, C.sub.3F.sub.8, and HF.

59. The method of claim 57, wherein the laser light beam(s) is focused or expanded.

60. The method of claim 57, wherein the laser light beam(s) is a pulsed type or a continuous wave type.

61. A method for cleaning a process chamber, comprising the steps of:

irradiating at least one laser beam to the interior of the process chamber, wherein the laser beam(s) ablates residues from the process chamber; and

removing the process residues from the process chamber by at least one carrier gas, thereby cleaning the process chamber.

62. The method of claim 61, wherein the laser beam(s) is a pulsed type or a continuous wave type.

63. The method of claim 61, wherein the laser beam(s) has a wavelength range from about 190 nm to about 10 μm.

64. The method of claim 61, wherein the laser beam(s) has an energy density range from about 1 kW/mm^2 to about 2 MW/mm^2.

65. The method of claim 61, wherein the carrier gas is selected from the group consisting of HF, N.sub.2, Ar, H.sub.2, He and other applicable gases. ?

66. A method for cleaning a process chamber, comprising the steps of:

irradiating at least one laser beam having a wavelength range from about 190 nm to about 10 μm and an energy density range from about 1 W/mm^2 to about 2 MW/mm^2 to the interior of the process chamber, wherein the laser beam(s) ablates residues from the process chamber; and

removing the process residues from the process chamber by at least one carrier gas, thereby cleaning the process chamber.

67. The method of claim 66, wherein the laser beam(s) is a pulsed type or a continuous wave type.

68. The method of claim 66, wherein the carrier gas is selected from the group consisting of HF, N_2, Ar, H_2, He and other applicable gases.